

Initial Storm Water Low Impact Development Submittal

For

Sterling Senior Communities

8145 Highway 116, Cotati, California

APN 144-040-011 & 021

JN 15160

December 3, 2018

Prepared for:

Townsend Capital Partners LLC

Attn: Steve Monahan

1101 5th Avenue, #300

San Rafael, CA 94901



David R. Brown, RCE 41833
My license expires 3/31/2020

Prepared by:

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civil engineering | land surveying | wastewater

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Prepared By: 
Checked By: _____

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- Appendix B – Exhibits and Calculations**
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- Appendix E – Operation and Maintenance Checklists**
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Storm Drain Master Plan Exhibits

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- Exhibit 3 – Proposed Improvement Projects (Table 6-2)**

**Initial Storm Water Low Impact Development Submittal
For
Sterling Senior Communities
8145 Highway 116, Cotati, California**

Project Description:

The proposed project is located at 8145 Highway 116 at intersection with Alder Avenue in Cotati, California. This project proposes to develop an assisted living and memory care facility that will include multiple commercial buildings and courtyard areas, asphalt parking, concrete pathways, required Low Impact Development (LID) features and associated hardscape and landscaping. The amount of proposed impervious surface triggers the requirement for the SUSMP and installation of Post-Construction BMPs.

The existing property has several abandoned buildings that will be demolished to accommodate the proposed improvements. The undeveloped portion of the parcels consists of existing grassy vegetation with sporadic tree coverage throughout. There will be a series of infiltration trenches throughout the property and a large rain garden in the parking area connected to the proposed stormdrain network. The proposed improvements will either discharge to the existing swale along the western edge of the property or to the existing stormdrain network along Alder Ave. The proposed Emergency Vehicle Access and parking area along the northern edge of the property line will be constructed with pervious paving to allow runoff to infiltrate beneath the paving.

Area A1 will consists of permeable pavement where the required storage volume will be contained below the perforated pipe. There are two additional areas calculated in the LID calculator, "Roadside Bioretention (HWY 116)" and "Roadside Bioretention (Future N-S Street)." These two areas are for the future development along those roads and are sized per linear foot of improvements from the centerline of their respective road.

Existing slopes in the area of the proposed improvements are relatively flat, typically less than 5%.

Pollution Prevention Measures and BMP Selection:

Runoff from proposed impervious areas will be concentrated and treated onsite. There will be a rain garden in the interior of the parking area with a gravel infiltration basin below to provide treatment/bio-retention and stormwater detention. There will also be gravel infiltration trenches along the northwestern and northeastern edges of the project to provide retention. The rain garden will be installed per attached detail P1-01 "Priority 1 Rain Garden", and the infiltration trenches will be installed per attached detail P1-07 "Priority 1 Infiltration Trench" from the Santa Rosa LID Design Manual. Additional prevention measures are:

- Design of landscaping to prevent sediment entering the storm drain system and to meet vector control requirements (draw down less than 72 hours).

- Incorporate Integrated Pest Management (IPM) principles and techniques for design and maintenance.
- Contain litter and trash so that it is not dispersed by the wind or runoff during waste removal.
- Maintain stabilized construction entrance to reduce sediment transport offsite.
- Conduct street sweeping at regular intervals to reduce sediment tracking.

Treatment and Volume Capture:

The Hydromodification Requirement of 100% Capture will be achieved in all proposed BMPs. As a result of meeting this requirement, treatment is not required, but will be provided in the vegetation and amended soil of the rain garden.

Maintenance and Funding:

Monitoring and maintenance of the post-construction BMPs shall be the responsibility of the owner until such a time as ownership is transferred. BMPs shall be inspected and maintained following the guidelines in attached “Rain Garden Inspection and Maintenance Checklist” from the Santa Rosa LID Design Manual. Legal paperwork and maintenance agreements shall be included in the Final SUSMP report.

City Storm Drain Master Plan

Final Storm Drain Master Plan for City of Cotati was prepared by Winzler and Kelly in 2002. The study reviewed existing storm drain system, analyzed the system with future developments and proposed improvements to address existing and future deficiencies. Hydraulic study results of the storm drain system for the watershed of the proposed project were shown in Exhibit 1 and 2, and proposed improvements were summarized in Exhibit 3. Within the project site watershed, there are two proposed improvements at nodes #2.1.3 and #3.1.1 are to upsize existing culverts crossing Highway 116 at upstream of the project site. None of these improvements or other improvements were found tied to this proposed development.

The future North-South Street was added to City General Plan in 2015, and was not included in the Winzler and Kelly’s drainage study. Runoff from the proposed project site has been and would continue to drain to the existing drainage channel that runs in south to north direction along the western property line. This drainage channel would be replaced by a new storm drain system when the North-South Street is constructed. The new storm drain will be analyzed and constructed as drainage improvements of the future North-South Street project.

Conclusion

Runoff from roof and parking areas, and other impervious surfaces will be directed toward the proposed LID features to allow for the required treatment and retention to occur prior to exiting the property.

Project Name: _____

| Best Management Practice (BMP) | Detail Sheet | Detail Title | Can be used with: | | | | | Achieves: | | | Volume Capture | | BMP In priority selected? | No | Unique Identifier of BMP per plan | Explanation of selection | Other notes: |
|---|------------------------------------|---|-------------------|---------------|-------------------|-----------|--------------------------|-----------|----|--------------------------|----------------|----|---------------------------|----|-----------------------------------|--|--------------|
| | | | High Ground Water | Contamination | Slope Constraints | Treatment | Runoff Reduction Measure | Yes | No | Runoff Reduction Measure | Yes | No | | | | | |
| Universal BMP- to be considered on all projects. | Living Roof | N/A | X | X | X | X | X | X | | | | | | | | | |
| | Rainwater Harvesting | N/A | X | X | X | X | X | X | | | | | | | | | |
| Runoff Reduction Measures | Interceptor Trees | N/A | X | X | X | | | | | X | | | | | | | |
| | Bovine Terrace | RRM-01 | X | | | | | | | X | | | | | | | |
| | Vegetated Buffer Strip | RRM-02 | | | | | | | | X | | | | | | | |
| | Impervious Area Disconnection | N/A | X | X | X | | | | | X | | | | | | | |
| Priority 1- to be installed with no underdrains or liners. Must drain all standing water within 72 hours. | Bioretention | P1-02 | | | | | | X | | | | | | | | | |
| | Vegetated Swale- with Bioretention | P1-06 | | | | | | X | | X | | | X | | | Able to provide retention and space for planting for aesthetic purposes. | |
| | Constructed Wetlands | N/A | | | | | | X | | X | | | | | | | |
| Priority 2 BMPs- with subsurface drains installed above the capture volume. | Bioretention | Roadside Bioretention - Flush Design Roadside | | | | | | X | | | | | | | | | |
| | | Roadside Bioretention- Contiguous SW | | | | | | X | | | | | | | | | |
| | | Roadside Bioretention- Curb Opening Roadside | | | | | | X | | | | | | | | | |
| | | Roadside Bioretention- No C & G | | | | | | X | | | | | | | | | |
| | Constructed Wetlands | N/A | | | | | | X | | X | | | | | | | |

Date: _____ Page _____ of _____

BMP Selection Table

APPENDIX B

| Best Management Practice (BMP) | Detail Sheet | Detail Title | Can be used with: | | | | Achieves: | | | BMP in priority selected? | | Explanation of selection | Other notes: |
|--|-----------------------------|--------------|---------------------------------|-------------------|-----------|----------------|--------------------------|-----|-----|-------------------------------------|--|--------------------------|--------------|
| | | | High Ground Water Contamination | Slope Constraints | Treatment | Volume Capture | Runoff Reduction Measure | Yes | No | Unique Identifier of BMP per Planes | | | |
| Priority 3 BMPs- installed with subdrains and/or impermeable liner. Does not achieve volume capture and must be used as part of a treatment train. | Bioretention | P3-02 | X | X | X | X | X | X | | | | | |
| | | P3-03 | X | X | X | X | X | X | | | | | |
| | | P3-04 | X | X | X | X | X | X | | | | | |
| | Flow Through Planters | P3-05 | X | X | X | X | X | X | | | | | |
| | | P3-06 | X | X | X | X | X | X | | | | | |
| | Vegetated Swale | P3-07 | X | X | X | X | X | X | | | | | |
| | | | | | | | | | | | | | |
| Priority 4 BMPs- does not achieve volume capture and must be used as part of a | Tree Filter Unit | | X | X | X | X | X | X | | | | | |
| | Modular Bioretention | | X | X | X | X | X | X | | | | | |
| Priority 5 BMPs- does not achieve volume capture and must be used as part of a treatment train. | Chambered Separator Units | | X | X | X | X | X | X | | | | | |
| | Centrifugal Separator Units | | X | X | X | X | X | X | | | | | |
| | Trash Excluders | | X | X | X | X | X | X | | | | | |
| | Filter Inserts | | X | X | X | X | X | X | | | | | |
| Priority 6 BMPs- see the "Offset Program" chapter for details. | Offset Program | | | | | | | N/A | N/A | N/A | | | |
| | | | | | | | | | | | | | |
| Other | Detention | | X | | | | | | | | | | |

APPENDIX A
Determination Worksheet

FOR OFFICE USE ONLY:

Does this project require permanent storm water BMP's?

Y N

Date Submitted: _____



| | |
|---------------------|----------|
| File No: | Quadrant |
| Related Files: | |
| Set: | |
| Department Use Only | |

2017 Storm Water LID Determination Worksheet

PURPOSE AND APPLICABILITY: Use this form to determine whether or not this project will need to incorporate permanent Storm Water Best Management Practices (BMP's) and submit a Storm Water Low Impact Development Submittal (SW LIDS) as required by the City's National Pollutant Discharge Elimination System Municipal Separate Storm Sewer Systems (NPDES MS4) only. Your project may still need to incorporate permanent storm water BMP's as required by other regulatory authority, such as, but not limited to CALGREEN or North Coast Regional Water Quality Control Board (NCRWQCB).

Part 1: Project Information

Sterling Senior Communities

Project Name

8145 Highway 116

Project Site Address

Cotati, CA 94931

Project City/State/Zip

Permit Number(s) - (if applicable)

Adobe Associates, Inc.

Designer Name

1220 N. Dutton Avenue, Santa Rosa, CA 95401

Designer City/State/Zip

Townsend Capital Partners, LLC

Applicant (owner or developer) Name

1101 5th Avenue, #300

Applicant Mailing Address

San Rafael / Ca / 94901

Applicant City/State/Zip

415-456-0600 / steve@monahanpacific.com

Applicant Phone/Email/Fax

1220 N. Dutton Avenue, Santa Rosa, CA 95401

Designer Mailing Address

707-541-2300 / dbrown@adobeinc.com

Designer Phone/Email

Type of Application/Project:

Subdivision

Grading Permit

Building Permit

Hillside Development

Design Review

Use Permit

Encroachment

Time Extensions

Other : _____

PART 2: Project Exemptions

- Is this a project that creates or replaces *less than* 10,000 square feet of impervious surface¹, including all project phases and off-site improvements?

Yes

No

¹ Impervious surface replacement, such as the reconstruction of parking lots or excavation to roadway subgrades, is not a routine maintenance activity. Reconstruction is defined as work that replaces surfaces down to the subgrade. Overlays, resurfacing, trenching and patching are defined as maintenance activities per section ??????

2017 Storm Water LID Determination Worksheet

2. Is this project a routine maintenance activity² that is being conducted to maintain original line and grade, hydraulic capacity, and original purpose of facility such as resurfacing existing roads and parking lots? Is
3. this project a stand alone pedestrian pathway, trail or off-street bike lane?

Yes No

4. **Did you answer "YES" to any of the questions in Part 2?**

YES: This project does *not* need to incorporate permanent Storm Water BMP's as required by the NPDES MS4 Permit. **Please complete Section 4 and "Exemption Signature Section" on Page 4.**

NO: Proceed with worksheet.

Part 3: Project Triggers

Projects that Trigger Requirements:

Please answer the following questions to determine whether this project requires permanent Storm Water BMP's and the submittal of a SW LIDs as required by the NPDES MS4 Permit order # ????????

1. Does this project create or replace a combined total of 10,000 square feet or more of impervious surface¹ including all project phases and off-site improvements?

Yes No

2. Does this project create or replace a combined total or 10,000 square feet or more of impervious streets, roads, highways, or freeway construction or reconstruction³? Yes No

3. Does this project create or replace a combined total of 1.0 acre or more of impervious surface¹ including all project phases and off-site improvements? Yes No

4. **Did you answer "YES" to any of the above questions in Part 3?**

YES: This project does *not* need to incorporate permanent Storm Water BMP's as required by the NPDES MS4 Permit. **Please complete Section 4 and "Exemption Signature Section" on Page 4**

NO: This project will *not* need to incorporate permanent Storm Water BMP's as required by the NPDES MS4 permit. **Please complete the "Exemption Signature Section" on Page 4.**

¹ Impervious surface replacement, such as the reconstruction of parking lots or excavation to roadway subgrades, is not a routine maintenance activity. Reconstruction is defined as work that replaces surfaces down to the subgrade. Overlays, resurfacing, trenching and patching are defined as maintenance activities.

² "Routine Maintenance Activity" includes activities such as overlays and/or resurfacing of existing roads or parking lots as well as trenching and patching activities and reroofing activities.

³ "Reconstruction" is defined as work that extends into the subgrade of a pavement section.

1. Total Project area: square feet
acres

Commercial Industrial Residential Public Other

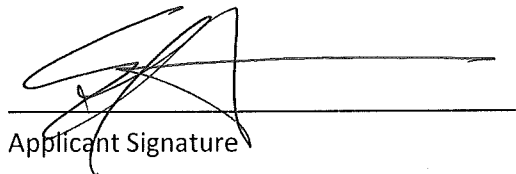
3. Existing impervious surface area: _____ square feet
_____ acres

Commercial Industrial Residential Public Other

5. Existing impervious surface area: _____ square feet
_____ acres

Acknowledgment Signature Section:

As the property owner or developer, I understand that this project is required to implement permanent Storm Water Best Management Practices and provide a Storm Water Low Impact Development Submittal (SW LIDS) as required by the City's National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer Systems (MS4) Permit.* Any unknown responses must be resolved to determine if the project is subject to these requirements.


Applicant Signature

11/19/18
Date

Exemption Signature Section:

As the property owner or developer, I understand that this project as currently designed does not require permanent Storm Water BMP's nor the submittal of a Storm Water Low Impact Development Submittal (SW LIDS) as required by the City's National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer Systems (MS4) Permit*. I understand that redesign may require submittal of a new Determination Worksheet and may require permanent Storm Water BMP's.

Applicant Signature

Date

* Your project may still need to incorporate permanent storm water BMP's as required by other regulatory authority, such as but not limited to CALGREEN or North Coast Regional Water Quality Control Board (NCRWQCB).

Implementation Requirements: All calculations shall be completed using the "Storm Water Calculator" available at:
www.srcity.org/stormwaterLID

Hydromodification Control/100% Volume Capture: Capture (infiltration and/or reuse) of 100% of the volume of runoff generated by a 1.0" 24-hour storm event, as calculated using the "Urban Hydrology for Small Watersheds" TR-55 Manual method. 100% volume capture is the ideal condition and if achieved satisfies all requirements so that no additional treatment is required. This is a retention requirement.

Treatment Requirement: Treatment of 100% of the flow calculated using the modified Rational Method and a known intensity of 0.20 inches per hour.

Delta Volume Capture Requirement: Capture (infiltration and/or reuse) of the increase in volume of storm water due to development generated by a 1.0" 24-hour storm event, as calculated using the "Urban Hydrology for Small Watersheds" TR-55 Manual method. This is a retention requirement.

APPENDIX B

Exhibits and Calculations

T:\2015 PROJECTS\5160.dwg Adobe-Design (Preliminary Design) Drainage\5160 Existing Condition Exhibit.dwg, Zachary Ruiz, 11/29/2018, 5:20:02 PM

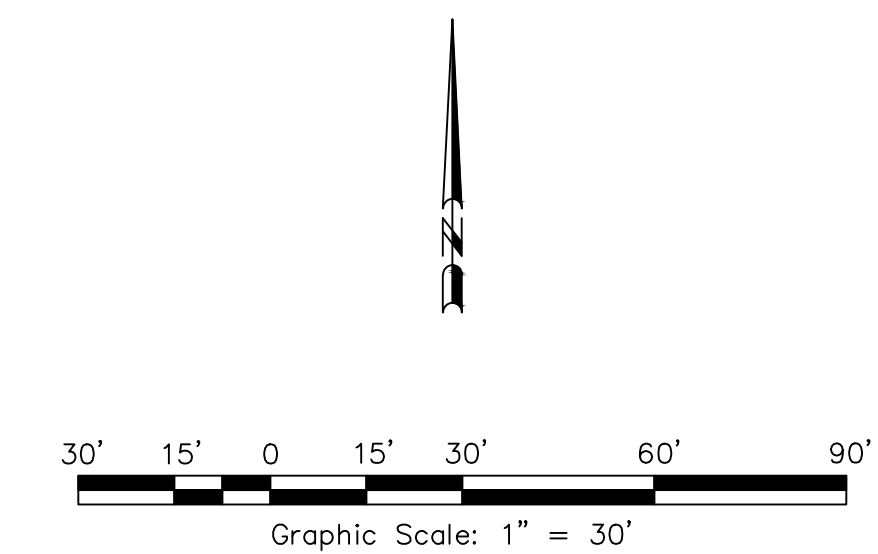


DRAINAGE AREA TABLE

A1=0.40 AC (17,500 SF)
A2=2.48 AC (107,950 SF)
A3=0.41 AC (17,750 SF)
A4=0.45 AC (19,400 SF)
A5=0.86 AC (37,670 SF)

DRAINAGE AREA LEGEND

- A1 DRAINAGE AREA
- DRAINAGE AREA BOUNDARY
- 1 POINT OF CONCENTRATION
- FLOW DIRECTION



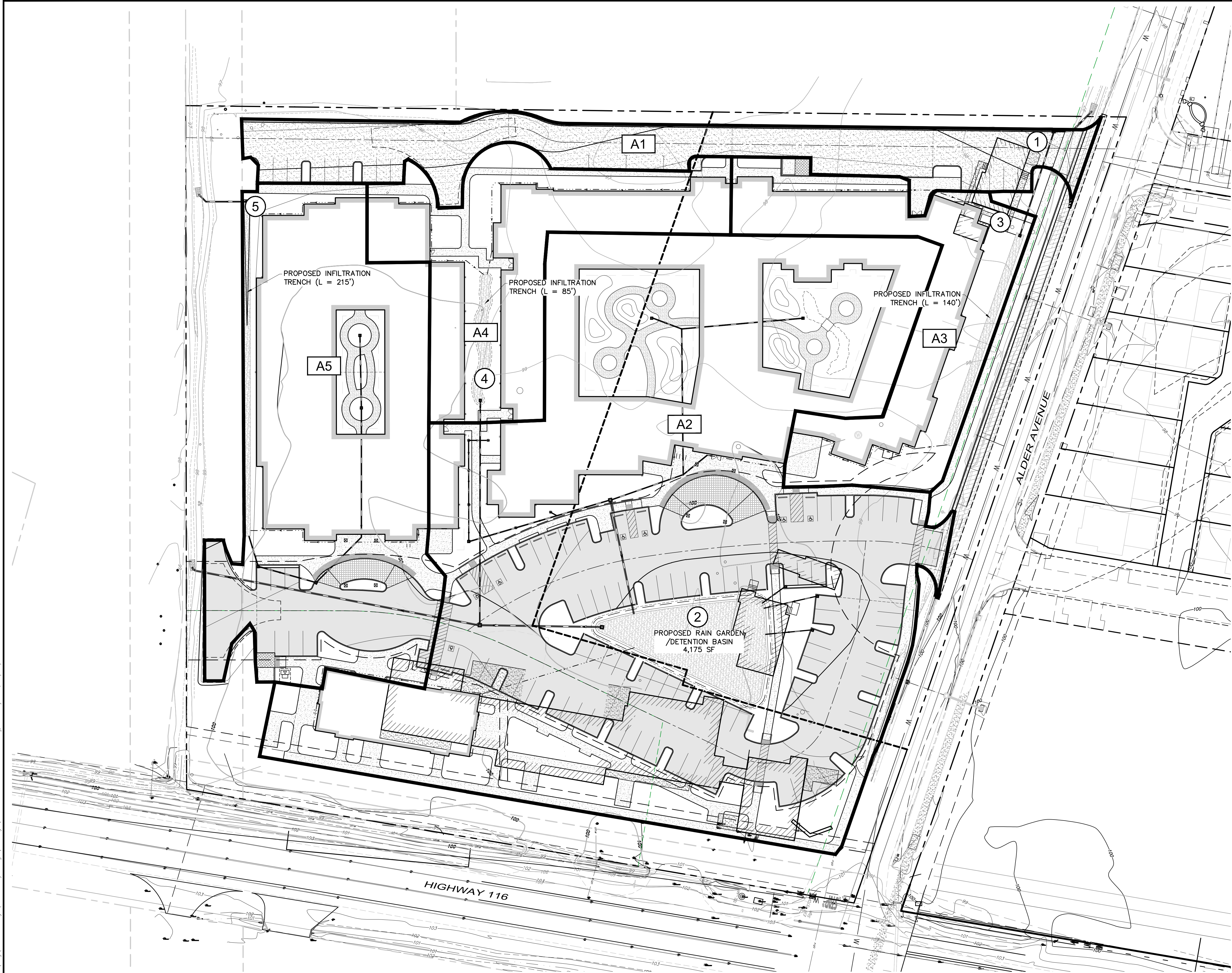
EXISTING CONDITION EXHIBIT

STERLING SENIOR COMMUNITIES
8145 Highway 116, Cotati, CA
APN 144-040-011 & 144-040-021

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"A Service You Can Count On!"

November 29, 2018

T:\2015 PROJECTS\15160.dwg Adobe-Design Preliminary Design\Drainage\15160 Initial SWLIDS Exhibit.dwg Zachary Ruiz, 11/29/2018 4:41:24 PM

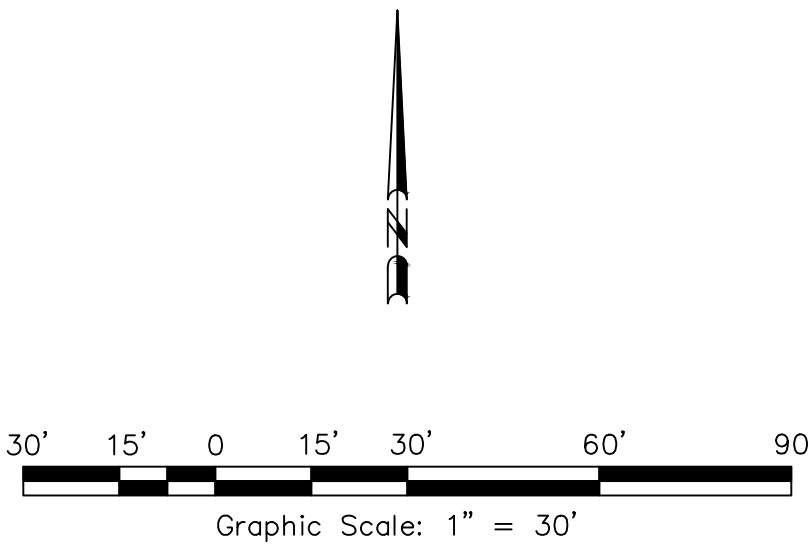


DRAINAGE AREA TABLE

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A2=2.48 AC (107,950 SF)
A3=0.41 AC (17,750 SF)
A4=0.45 AC (19,400 SF)
A5=0.86 AC (37,670 SF)

DRAINAGE AREA LEGEND

- A1 DRAINAGE AREA
- DRAINAGE AREA BOUNDARY
- ① POINT OF CONCENTRATION
- ← FLOW DIRECTION



November 29, 2018

INITIAL SWLIDS EXHIBIT

STERLING SENIOR COMMUNITIES
8145 Highway 116, Cotati, CA
APN 144-040-011 & 144-040-021

adobe associates, inc.
civil engineering | land surveying | wastewater

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*A Service You Can Count On™



STORM WATER CALCULATOR

LID BMP Summary Page & Site Global Values

| | | |
|--|--|---|
| Project Information: Project Name: <u>Townsend Assisted Living & Memory Care Facility</u> Address/Location: <u>Alder Ave and Hwy 116, Cotati</u> Designer: <u>KH, ZR</u> Date: <u>9/28/2018</u> | Site Information: Mean Seasonal Precipitation (MSP) of Project Site: <u>30.00</u> (inches) K=MSP/3(K= <u>1.00</u> Impervious area - pre development: <u>19,166.0</u> ft ² Impervious area - post development: <u>131,115.0</u> ft ² | Based upon the pre and post development impervious area, the post construction BMP requirement is: 100% Capture |
|--|--|---|

Summary of Saved BMP Results:

| BMP ID: | Tributary Area | | Requirements | | | BMP Design Results | | | | | |
|---------------|-----------------------------------|---------------------------------|-------------------------|--|--|---|-----------------------------|----------------------------|-----------------------------|------------------------------------|-----------------------------|
| | Tributary Area (ft ²) | Runoff Reduction Measures (Y/N) | Type of Requirement Met | Type of BMP Design | Percent Achieved | Hydromodification Control | | Flow Base Treatment | | Delta Volume Capture | |
| | | | | | | Required V _{Hydromod} (ft ³) | Achieved (ft ³) | Required Q Treatment (cfs) | Achieved (ft ³) | Required Vdelta (ft ³) | Achieved (ft ³) |
| 1 | A2 | 107,950 | No | Hydromod Volume Capture | Priority 1: P1-01 Rain Garden | 130.3 | 2881.2 | 3753.0 | | | |
| 2 | A3 | 17,750 | No | Hydromod Volume Capture | Priority 1: P1-07 Infiltration Trench | 118.2 | 473.7 | 560.0 | | | |
| 3 | A4 | 19,400 | No | Hydromod Volume Capture | Priority 1: P1-07 Infiltration Trench | 113.3 | 517.8 | 586.5 | | | |
| 4 | A5 | 37,670 | No | Hydromod Volume Capture | Priority 1: P1-07 Infiltration Trench | 119.8 | 1005.4 | 1204.0 | | | |
| 5 (HWY 116) | 74 | No | Hydromod Volume Capture | Priority 2: P2-02 Roadside Bioretention - Flush Design | 104.8 | 2.5 | 2.6 | | | | |
| 6 N-S Street) | 36 | No | Hydromod Volume Capture | Priority 2: P2-02 Roadside Bioretention - Flush Design | 104.4 | 1.2 | 1.3 | | | | |
| 7 | A1 | 17,500 | No | Hydromod Volume Capture | Priority 2: P2-02 Roadside Bioretention - Flush Design | 134.7 | 415.6 | 560.0 | | | |
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STORM WATER CALCULATOR

BMP Tributary Parameters

Project Name: **Townsend Assisted Living & Memory Care Facility**

BMP ID: **A2**
BMP Design Criteria: **100% Capture**
Type of BMP Design: **Priority 1: P1-01 Rain Garden**
BMP's Physical Tributary Area: **107,950.0** ft²
Description/Notes:

Hydromodification Requirement: 100% Volume Capture; $V_{HYDROMOD}$

$V_{HYDROMOD}$ = **2,881.19** ft³

Post development hydrologic soil type within tributary area: **C: 0.05 - 0.15 in/hr infiltration (transmission) rate**

Post development ground cover description: **Residential - 1/8 acre or less (town houses)**

CN_{POST}: **90**

User Composite post development CN: **0.0**

BMP Sizing Tool: Hydromodification Requirement

Percent of Goal Achieved = **130.26** %

BMP Volume Below Ground
Porosity: **0.40**
Depth below perforated pipe if present: **1.50** ft
Width: **0.00** ft
Length: **0.00** ft
Area: **4,170.00** ft²

Ponded Water Above Ground
Depth: **0.30** ft
Width: **0.00** ft
Length: **0.00** ft
Area: **4,170.00** ft²



STORM WATER CALCULATOR

BMP Tributary Parameters

Project Name: **Townsend Assisted Living & Memory Care Facility**

BMP ID: **A3**
BMP Design Criteria: **100% Capture**
Type of BMP Design: **Priority 1: P1-07 Infiltration Trench**
BMP's Physical Tributary Area: **17,750.0** **ft²**
Description/Notes:

Hydromodification Requirement: 100% Volume Capture; $V_{HYDROMOD}$

$V_{HYDROMOD}$ = **473.75** **ft³**

Post development hydrologic soil type within tributary area: **C: 0.05 - 0.15 in/hr infiltration (transmission) rate**

Post development ground cover description: **Residential - 1/8 acre or less (town houses)**

CN_{POST}: **90**

User Composite post development CN: **0.0**

BMP Sizing Tool: Hydromodification Requirement

Percent of Goal Achieved = **118.21** %

**BMP Volume
Below Ground**
Porosity: **0.40**
Depth below perforated pipe if present: **2.00** ft
Width: **5.00** ft
Length: **140.00** ft
Area: **0.00** ft²

**Ponded Water
Above
Ground**
Depth: **0.00** ft
Width: **0.00** ft
Length: **0.00** ft
Area: **0.00** ft²



STORM WATER CALCULATOR

BMP Tributary Parameters

Project Name: **Townsend Assisted Living & Memory Care Facility**

BMP ID: **A4**

BMP Design Criteria: **100% Capture**

Type of BMP Design: **Priority 1: P1-07 Infiltration Trench**

BMP's Physical Tributary Area: **19,400.0** ft²

Description/Notes:

Hydromodification Requirement: 100% Volume Capture; $V_{HYDROMOD}$

$V_{HYDROMOD}$ = **517.79** ft³

Post development hydrologic soil type within tributary area: **C: 0.05 - 0.15 in/hr infiltration (transmission) rate**

Post development ground cover description: **Residential - 1/8 acre or less (town houses)**

CN_{POST}: **90**

User Composite post development CN: **0.0**

BMP Sizing Tool: Hydromodification Requirement

Percent of Goal Achieved = **113.27** %

BMP Volume Below Ground

Porosity: **0.40**

Depth below perforated pipe if present: **2.50** ft

Width: **6.00** ft

Length: **85.00** ft

Area: **0.00** ft²

Ponded Water Above Ground

Depth: **0.30** ft

Width: **3.00** ft

Length: **85.00** ft

Area: **0.00** ft²



STORM WATER CALCULATOR

BMP Tributary Parameters

Project Name: **Townsend Assisted Living & Memory Care Facility**

BMP ID: **A5**
BMP Design Criteria: **100% Capture**
Type of BMP Design: **Priority 1: P1-07 Infiltration Trench**
BMP's Physical Tributary Area: **37,670.0 ft²**
Description/Notes:

Hydromodification Requirement: 100% Volume Capture; $V_{HYDROMOD}$

$V_{HYDROMOD}$ = **1,005.41** ft³

Post development hydrologic soil type within tributary area: **C: 0.05 - 0.15 in/hr infiltration (transmission) rate**

Post development ground cover description: **Residential - 1/8 acre or less (town houses)**

CN_{POST}: **90**

User Composite post development CN: **0.0**

BMP Sizing Tool: Hydromodification Requirement

Percent of Goal Achieved = **119.75** %

BMP Volume Below Ground
Porosity: **0.40**
Depth below perforated pipe if present: **3.50** ft
Width: **4.00** ft
Length: **215.00** ft
Area: **0.00** ft²

Ponded Water Above Ground
Depth: **0.00** ft
Width: **0.00** ft
Length: **0.00** ft
Area: **0.00** ft²



STORM WATER CALCULATOR

BMP Tributary Parameters

Project Name: **Townsend Assisted Living & Memory Care Facility**

BMP ID: **Roadside Bioretention (HWY 1)**
BMP Design Criteria: **100% Capture**
Type of BMP Design: **Priority 2: P2-02 Roadside Bioretention - Flush Design**
BMP's Physical Tributary Area: **74.0 ft²**
Description/Notes:

Hydromodification Requirement: 100% Volume Capture; $V_{HYDROMOD}$

$V_{HYDROMOD}$ = **2.48** ft³

Post development hydrologic soil type within tributary area: **C: 0.05 - 0.15 in/hr infiltration (transmission) rate**

Post development ground cover description: **Streets and roads - Paved; open ditches (excluding right-of-way)**

CN_{POST}: **92**

User Composite post development CN: **0.0**

BMP Sizing Tool: Hydromodification Requirement

Percent of Goal Achieved = **104.82** %

BMP Volume Below Ground
Porosity: **0.40**
Depth below perforated pipe if present: **2.00** ft
Width: **1.00** ft
Length: **3.25** ft
Area: **0.00** ft²

Ponded Water Above Ground
Depth: **0.00** ft
Width: **0.00** ft
Length: **0.00** ft
Area: **0.00** ft²



STORM WATER CALCULATOR

BMP Tributary Parameters

Project Name: **Townsend Assisted Living & Memory Care Facility**

BMP ID: **Roadside Bioretention (Future)**
BMP Design Criteria: **100% Capture**
Type of BMP Design: **Priority 2: P2-02 Roadside Bioretention - Flush Design**
BMP's Physical Tributary Area: **36.0** ft²
Description/Notes:

Hydromodification Requirement: 100% Volume Capture; $V_{HYDROMOD}$

$V_{HYDROMOD}$ = **1.21** ft³

Post development hydrologic soil type within tributary area: **C: 0.05 - 0.15 in/hr infiltration (transmission) rate**
Post development ground cover description: **Streets and roads - Paved; open ditches (excluding right-of-way)**
CN_{POST}: **92**
User Composite post development CN: **0.0**

BMP Sizing Tool: Hydromodification Requirement

Percent of Goal Achieved = **104.42** %

BMP Volume Below Ground
Porosity: **0.40**
Depth below perforated pipe if present: **1.50** ft
Width: **1.00** ft
Length: **2.10** ft
Area: **0.00** ft²

Ponded Water Above Ground
Depth: **0.00** ft
Width: **0.00** ft
Length: **0.00** ft
Area: **0.00** ft²



STORM WATER CALCULATOR

BMP Tributary Parameters

Project Name: **Townsend Assisted Living & Memory Care Facility**

BMP ID: **A1**
BMP Design Criteria: **100% Capture**
Type of BMP Design: **Priority 2: P2-02 Roadside Bioretention - Flush Design**
BMP's Physical Tributary Area: **17,500.0** ft²
Description/Notes:

Hydromodification Requirement: 100% Volume Capture; $V_{HYDROMOD}$

$V_{HYDROMOD}$ = **415.63** ft³

Post development hydrologic soil type within tributary area: **C: 0.05 - 0.15 in/hr infiltration (transmission) rate**

Post development ground cover description: **Streets and roads - Gravel (including right-of-way)**

CN_{POST}: **89**

User Composite post development CN: **0.0**

BMP Sizing Tool: Hydromodification Requirement

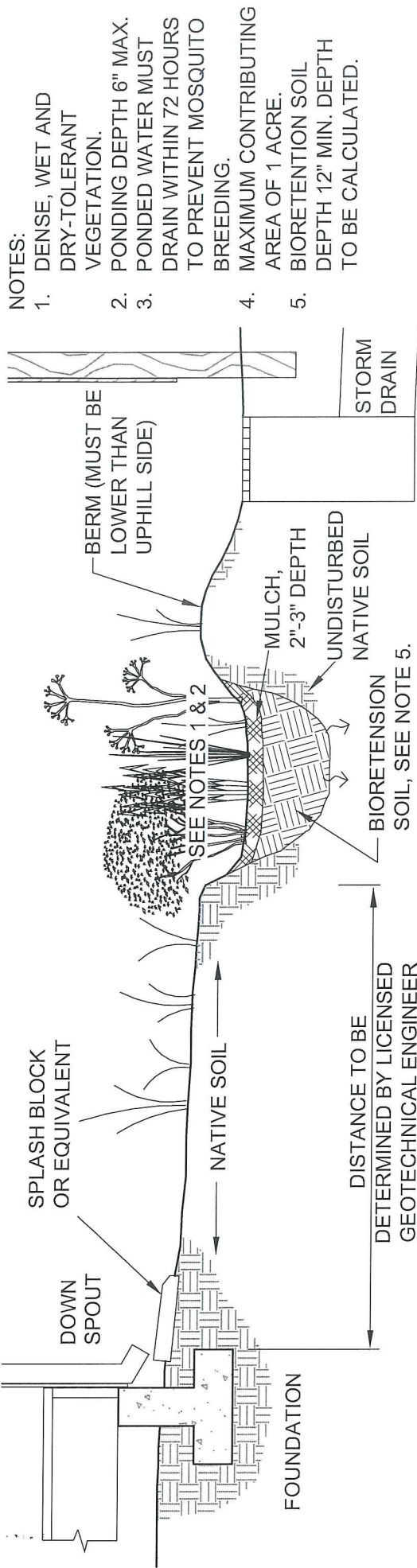
Percent of Goal Achieved = **134.74** %

BMP Volume Below Ground
Porosity: **0.40**
Depth below perforated pipe if present: **0.08** ft
Width: **0.00** ft
Length: **0.00** ft
Area: **17,500.00** ft²

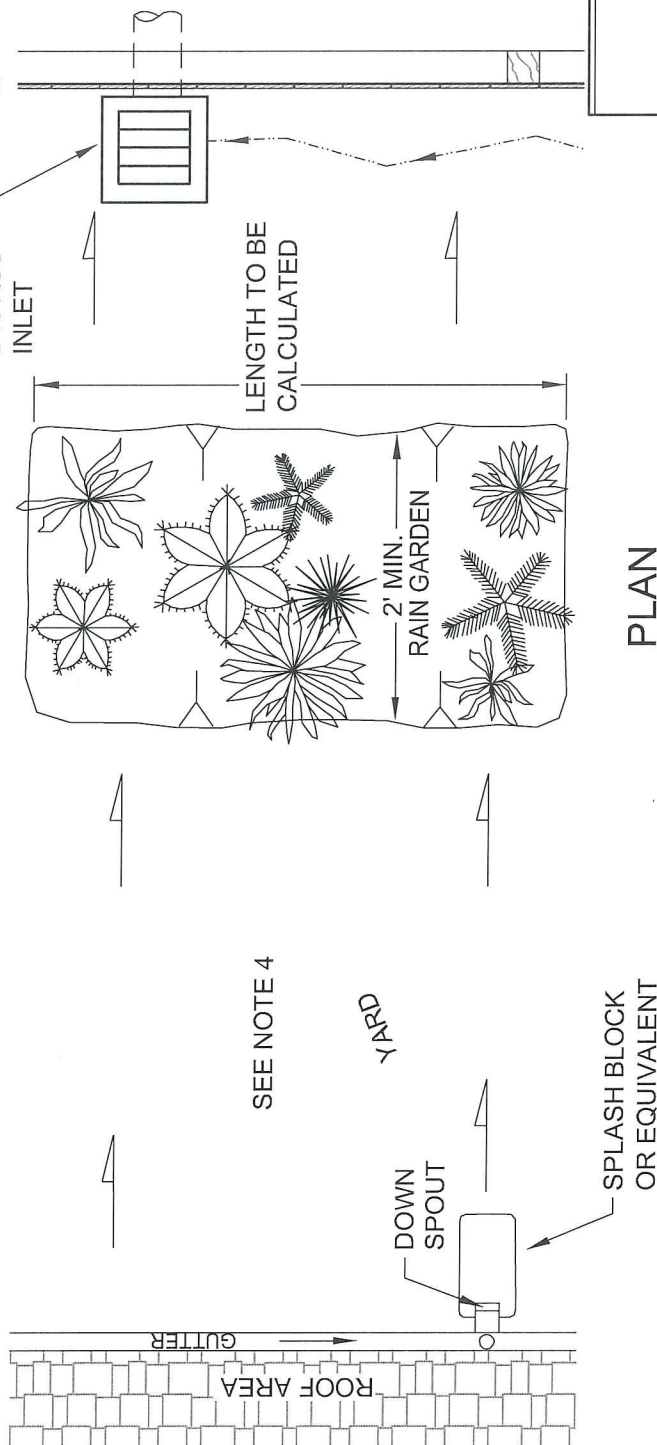
Ponded Water Above Ground
Depth: **0.00** ft
Width: **0.00** ft
Length: **0.00** ft
Area: **0.00** ft²

APPENDIX C

Rain Garden Detail and Fact Sheets



TYPICAL SECTION



PLAN

- NOTES:
1. DENSE, WET AND DRY-TOLERANT VEGETATION.
 2. PONDING DEPTH 6" MAX.
 3. PONDED WATER MUST DRAIN WITHIN 72 HOURS TO PREVENT MOSQUITO BREEDING.
 4. MAXIMUM CONTRIBUTING AREA OF 1 ACRE.
 5. BIORETENTION SOIL DEPTH 12" MIN. DEPTH TO BE CALCULATED.

PRIORITY 1
RAIN GARDEN

SCALE: NONE DATE: 05/10/11

DWN. D/T
CHK. HH

SHEET 1 of 1

P1-01

Not to Scale

FACT SHEET- RAIN GARDEN

RAIN GARDEN

Also know as: Bioretention cell, infiltration planter



DESCRIPTION

Rain Gardens function as a soil and plant-based filtration and infiltration feature that remove pollutants through a variety of natural physical, biological, and chemical treatment processes. Rain gardens are usually installed in yards or common open areas to treat storm water from rooftops and parking lots.

ADVANTAGES

- Provides both water quality treatment and volume capture.
- Provides storm water treatment that enhances water quality of downstream water bodies through natural processes.
- Vegetation provides shade and wind breaks, absorbs noise, reduces heat island effects and adds to an area's landscape features.
- Establishes habitat for birds and attracts pollinators like butterflies and bees.

LIMITATIONS

- Most effective if installed flat to promote infiltration.
- Prohibited in areas of known soil and/or groundwater contamination. If soil and/or groundwater contamination is present on the site or within a 100' radius of the proposed location, the North Coast Regional Board review and approval is required.

FACT SHEET- RAIN GARDEN

- Should not be used in areas of high ground water. A minimum of 2' of clearance needs to be provided between the bottom of the BMP and the seasonal high ground water level. If ground water is less than 2' from the bottom, additional design elements may be necessary (impermeable liner, subdrains, etc).
- Do not use in areas of slope instability where infiltrated storm water may cause failure. Slope stability shall be determined by a licensed Geotechnical Engineer.
- Do not use in locations that can negatively impact building foundation or footings. Location shall be approved by a licensed Geotechnical Engineer.

KEY DESIGN FEATURES

- Native soil shall remain uncompacted to preserve infiltration capacity. Fence off during construction.
- Bottom of rain garden should be unlined to allow infiltration into native soil.
- If present, structural soil shall be installed as described in Reference Document E.
- For rain garden that adjoin pavement or utility trenches, moisture barrier shall be installed to protect road sub-base and any trenches.
- Use plants from the approved plant and tree list included in Appendix M.
- Devise vegetation that is both wet and dry tolerant is required.
- Design to achieve 51% cover.
- Install a designated high flow bypass inlet for storms larger than the design storm. See "Sizing Design" below.
- If required, perforated pipe shall be a minimum of SDR 35 plastic and installed in straight runs.
- Volume below the perforated pipe must be sufficient to hold and infiltrate the design volume.
- Surface ponding depth shall range between 6" and 12".
- Must be designed to prevent extended standing water. All surface water must drain within 72 hours to prevent mosquito breeding.
- Select non-floatable surface mulching material to prevent clogging of downstream inlets.
- Direct downspouts into rain gardens and incorporate splash blocks and/or other dissipation methods to prevent erosion.

SIZING DESIGN- GOAL AND REQUIREMENTS

- The **design goal** for all rain gardens is to capture (infiltration and/or reuse) 100% of the volume of runoff generated by the 85th percentile 24 hour storm event. This is a retention requirement. If 100% volume capture is achieved than no additional treatment is required.
- If the *design goal* is not achievable, then the bioretention area *sizing requirement* is:

FACT SHEET- RAIN GARDEN

- **Water Quality Treatment** of 100% of the flow generated by the 85th percentile 24 hour storm event, as calculated using the Rational Method and a known intensity of 0.92 inches per hour, **and**
- **Volume Capture** (infiltration and/or reuse) of the increase in volume of storm water due to development generated by the 85th percentile 24 hour storm event. This is a retention requirement.
- All calculations shall be completed using the “Storm Water Calculator” available at www.srcity.org/stormwaterLID.

Inspection and Maintenance Requirements

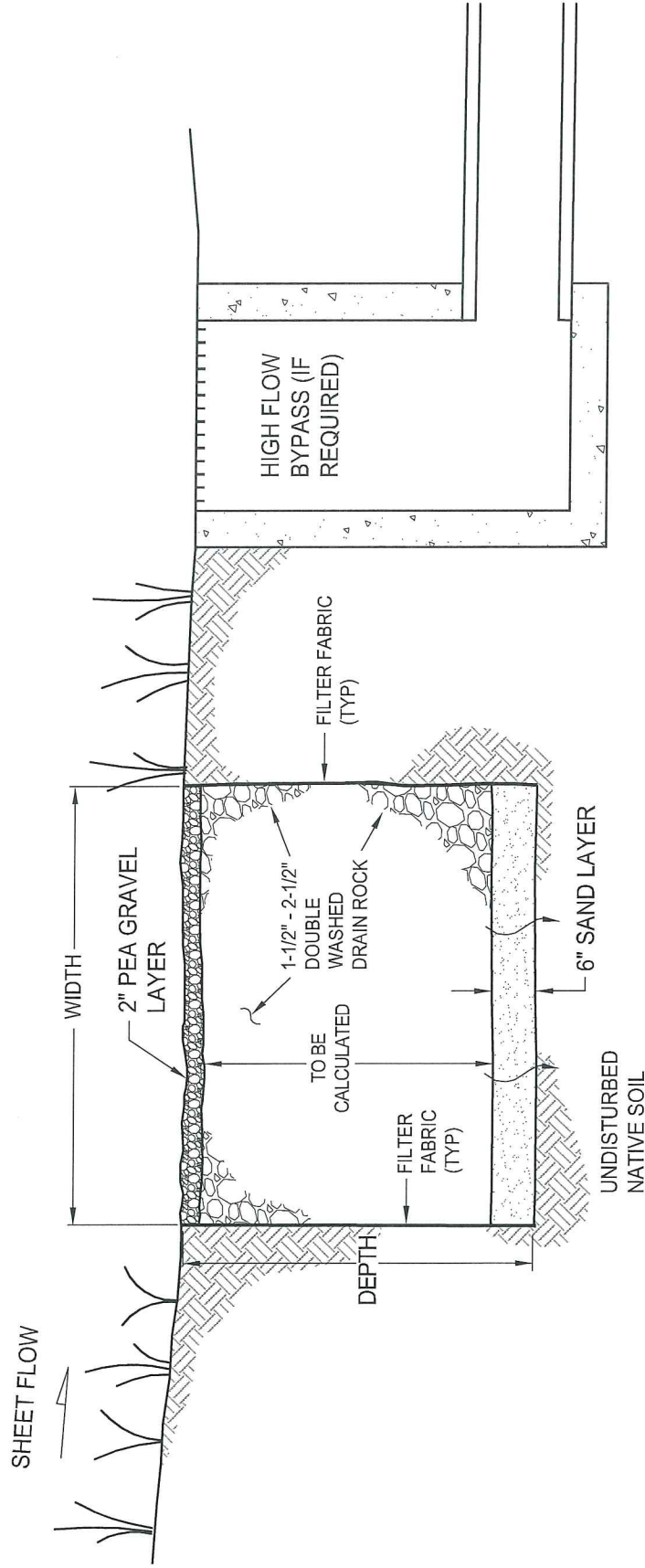
A maintenance plan shall be provided with the Final SUSMP. The maintenance plan shall include recommended maintenance practices, state the parties responsible for maintenance and upkeep, specify the funding source for ongoing maintenance with provisions for full replacement when necessary and provide site specific inspection checklist.

At a minimum inspection and maintenance shall include the following:

- Inspect twice annually and prior to rain events for blocked or clogged inlets, eroded areas, sedimentation and trash or debris accumulation.
- Obstructions and trash shall be removed and properly disposed of.
- Inspect twice during the rainy season for ponded water.
- If ponded water is observed, the first few inches of topsoil should be removed and replaced. If ponded water is still present, further grading and replacement may be necessary to prevent mosquito breeding.
- Pesticides and fertilizers shall not be used in the rain garden area. Non floatable mulch should be instead.
- Plants should be pruned, weeds pulled and dead plants replaced as needed.
- Observe level and condition of mulch. Add to, re-grade or replace as needed (non-floatable mulch required).
- Confirm slash blocks, or other dissipation method, exist to direct downspouts into rain garden. Readjust location if needed. Replace if necessary.

APPENDIX D

Infiltration Trench Detail and Fact Sheets



- NOTES:
1. DEPTH SHALL NOT EXCEED EITHER WIDTH OR LENGTH, WHICHEVER IS GREATER.
 2. TO BE USED AS PART OF A TREATMENT TRAIN THAT PROVIDES TREATMENT.
 3. ALL SURFACE WATER MUST DRAIN WITHIN 72 HOURS TO PREVENT MOSQUITO BREEDING.

PRIORITY 1
INFILTRATION TRENCH

| | |
|-----------------------------------|-----------------------|
| SCALE: <i>NONE</i> | DATE: <i>05/10/11</i> |
| DWN. <i>DIT</i> CHK. <i>HH</i> | P1-07 |

Not to Scale

FACT SHEET- INFILTRATION TRENCH

INFILTRATION TRENCH

Also know as: Infiltration Gallery, Soakage Trench



DESCRIPTION

Infiltration Trenches are typically long narrow trenches that are filled with gravel that receive storm water and allow it to infiltrate into the soil. Infiltration trenches can be used to intercept storm water from landscape or open space before it crosses onto paved area or can be used as part of a treatment train with other BMP (such as Vegetated Buffer Strips or Vegetated Swales) to achieve the Volume Capture requirement.

ADVANTAGES

- Provides volume capture.
- Can be used as part of a treatment train with treatment BMPs.
- Can be used on sloped sites.
- Simple to install.

LIMITATIONS

- Does not achieve treatment.

FACT SHEET- INFILTRATION TRENCH

- Impacts to adjacent buildings and overflow requirements need to be considered in design.
- Requires adequate space.

KEY DESIGN FEATURES

- Install a designated high flow bypass inlet or route.
- Design to prevent standing water. All surface water must drain within 72 hours to prevent mosquito breeding.

SIZING DESIGN- GOAL AND REQUIREMENTS

- The **design goal** is to capture of 100% of the runoff volume generated by the 85th percentile 24 hour storm event. 100% volume capture has been established as the ideal condition. If achieved, all requirements are satisfied and no additional treatment is required. This is a retention requirement.
- If the *design goal* is not achievable, then the rain water harvesting *sizing requirement* is:
 - **Volume Capture** of the increase in volume of storm water due to development generated by the 85th percentile 24 hour storm event, as calculated using the "Urban Hydrology for Small Watersheds" TR-55 Manual.
- All calculations shall be completed using the "Storm Water Calculator" available at www.srcity.org/stormwaterLID

INSPECTION AND MAINTENANCE REQUIREMENTS

A maintenance plan shall be provided with the Final SUSMP. The maintenance plan shall include recommended maintenance practices, identify the parties responsible for maintenance and upkeep, specify the funding source for ongoing maintenance with provisions for full replacement when necessary and provide site specific inspection checklist.

At a minimum inspection and maintenance shall include the following:

- Inspect twice annually for ponded water. If ponded water is observed, the top layer of pea gravel will need to be replaced.
- If ponded water remains, further grading and replacement may be necessary to prevent mosquito breeding.
- The high flow inlet should be inspected and cleaned as necessary to remove any obstructions.
- Pesticides and fertilizers shall not be used in vegetated areas draining to the infiltration trench.
- Remove any accumulated sediment and/or trash.

APPENDIX E

Inspection and Maintenance Checklists

Form A

(circle one)

if Yes, attach Form B for Project:

S = Satisfactory
D = Deficient

[illegible][illegible][illegible][illegible]

Page of

Date: _____

Inspector: _____

Start Time: _____

Project: _____

Stop Time: _____

Address: _____

D = Deficient

[illegible]

Re-Inspection Required:

Date: _____

Inspector: _____

Project: _____

Address: _____

[illegible]

APPENDIX F

Soil Classification Fact Sheets

Soil Map—Sonoma County, California
(Townsend Assisted Living & Memory Care Facility)



Map Unit Legend

| Sonoma County, California (CA097) | | | |
|-----------------------------------|--|--------------|----------------|
| Map Unit Symbol | Map Unit Name | Acres in AOI | Percent of AOI |
| HaB | Haire fine sandy loam, hummocky, 0 to 5 percent slopes | 5.8 | 100.0% |
| Totals for Area of Interest | | 5.8 | 100.0% |

Sonoma County, California

HaB—Haire fine sandy loam, hummocky, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: hfdm

Elevation: 20 to 2,400 feet

Mean annual precipitation: 30 inches

Mean annual air temperature: 57 degrees F

Frost-free period: 200 to 300 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Haire and similar soils: 85 percent

Minor components: 15 percent

*Estimates are based on observations, descriptions, and transects of
the mapunit.*

Description of Haire

Setting

Landform: Terraces

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Base slope

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Alluvium derived from sedimentary rock

Typical profile

H1 - 0 to 20 inches: fine sandy loam

H2 - 20 to 36 inches: clay

H3 - 36 to 60 inches: very cobbly clay loam

Properties and qualities

Slope: 0 to 5 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Moderately well drained

Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat):

Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Moderate (about 6.4 inches)

Interpretive groups

Land capability classification (irrigated): 3e

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: C

Hydric soil rating: No

Minor Components

Zamora

Percent of map unit: 10 percent

Hydric soil rating: No

Clear lake

Percent of map unit: 5 percent

Landform: Depressions

Hydric soil rating: Yes

Data Source Information

Soil Survey Area: Sonoma County, California

Survey Area Data: Version 10, Sep 27, 2016

APPENDIX G

Maintenance and Monitoring Agreement

RECORDING REQUESTED BY AND WHEN RECORDED MAIL TO:

City of Cotati
Department of Public Works/Engineering
201 West Sierra Avenue
Cotati, California 94931
Attn: [Name]

Property: [ADDRESS], Cotati, California
APN: [000-000-000]

**MAINTENANCE AND MONITORING AGREEMENT AND DECLARATION OF
COVENANTS REGARDING STORM WATER BMP FACILITIES**

THIS AGREEMENT is made and entered into this [DATE] (Effective Date), by and between [NAME] (Developer), and City of Cotati (City).

RECITALS

A. The North Coast Regional Water Quality Control Board NPDES Permit, Order Number R1-2009-0050 (“NPDES Permit”), requires that the City shall require that all new development and redevelopment projects subject to post-construction Best Management Practices (“BMP”) requirements provide for maintenance of BMPs by way of legally binding maintenance agreements and/or other equivalent measures.

B. The NPDES Permit further requires that BMP maintenance agreements shall ensure that the BMPs implemented will remain fully functional, and that all areas identified for treatment and/or volume capture will discharge to the treatment BMP system as identified and approved.

C. The NPDES Permit further specifically requires: (i) Developer’s signed statement accepting responsibility for maintenance of BMPs until the responsibility is legally transferred; (ii) written conditions in any sales or lease agreement, in enough detail to be easily understood by the future owner or tenant, that require the property owner or tenant to assume responsibility for BMP maintenance and conduct a maintenance inspection at least once a year; and (iii) that the City notify the Regional Water Board and commence progressive enforcement against the owner or operator where necessary to rectify failure to implement and maintain post-construction BMPs.

D. The Storm Water Low Impact Development Technical Design Manual (“LID Manual”) adopted by the City and City of Santa Rosa further requires a legally binding, signed maintenance agreement or equivalent mechanism for all BMPs located on private property.

E. The LID Manual requires that maintenance agreements shall legally assign maintenance responsibility to the property owner; shall be recorded among the deed records at the City Recorder’s Office so they will run with the title to the land; and shall be included in any future sales and/or lease agreements.

F. The LID Manual further requires that the funding of all inspection, maintenance,

and replacement of BMPs on private land is the sole responsibility of the property owner, and that annual inspections and maintenance and any corrective actions, repairs, or replacements shall be documented, retained for at least five years, and made available to the City upon request.

G. Developer is the owner of certain real property described in Exhibit A, attached hereto and incorporated as though fully set forth herein (“Property”).

H. City has approved a project on the Property consisting of the subdivision of the Property and the [WORK DESCRIPTION AND PERMIT NUMBER] (“Project”), subject to conditions of approval and the requirements of the Project proposal statement.

I. The Project includes a final Storm Water Mitigation Plan (SWMP) that has been submitted, reviewed, and approved, and that includes provisions for the construction of BMPs identified in Exhibit B, attached hereto and incorporated as though fully set forth herein.

J. The SWMP identifies post-construction storm water management BMPs, assigns monitoring and maintenance responsibility to the project owner, and includes Inspection and Maintenance Checklists that identify when and how BMPs will be inspected, when maintenance will be required, and how maintenance has or will be conducted.

K. [USE THIS RECITAL IF TRANSFER TO HOA] xyz.

L. [USE THIS RECITAL IF TRANSFER TO INDIVIDUAL PROPERTY OWNERS] xyz.

M. [USE THE FOLLOWING TWO RECITALS IF TRANSFER TO BOTH HOA AND INDIVIDUAL PROPERTY OWNER] xyz.

a. WHEREAS, [alternatives—HOA/Individual Property Owners/Both] . . .

AGREEMENT

NOW, THEREFORE, in consideration of the foregoing recitals, the mutual covenants contained herein, and the following terms and conditions, the parties agree as follows:

1. Responsibility for Installation, Operation, and Maintenance. Developer shall, at its sole cost and expense, construct, inspect, and maintain the BMPs in accordance with the conditions of approval and SWMP specifications.
2. Developer shall ensure the BMPs remain fully functional and in good working condition as determined solely by the City, and that all areas identified for treatment discharge to the treatment BMP system.
3. Developer accepts sole responsibility for all inspection, maintenance, remediation, and replacement of the BMPs.
4. These responsibilities run with the land, and shall transfer to the new owner or tenant in the event the Property is sold or leased.

5. Developer will perform inspections and maintenance in accordance with the SWMP. All work shall conform to the requirements of the SWMP, City-identified BMP manuals and handbooks, and specific maintenance requirements established by the manufacturer as approved by the City. Specific manufacturer maintenance requirements for the BMP will be submitted to the City.
6. Developer hereby grants permission to the City and its authorized agents and employees to enter the Property and inspect the storm water management/BMP facilities whenever the City deems necessary. The purpose of the inspection is to assure safe and proper functioning of the facilities, including any berms, inlet and outlet structures, vegetation, infiltration media, pond areas, underground retention areas, and access roads. If deficiencies are noted, City shall notify Developer and provide the inspection findings and requirements to cure the deficiencies.
7. Developer hereby grants permission to City and its authorized agents, employees, and consultants to enter upon the Property to install, operate and maintain equipment to monitor the flow characteristics and pollutant content of the influent, effluent and intermediate points in the facilities. Developer further agrees to design and construct the facility to provide access for monitoring as outlined in the LID manual and/or in the manufacturer manual for the BMP.
8. All records regarding inspections and maintenance shall be retained by Developer for at least five years and made available to the City upon request. These records shall include copies of completed inspection reports and maintenance checklists to document any inspection and maintenance activities that were conducted over the last five years. Any corrective actions, repairs, or replacements shall also be documented and kept in the BMP inspection and maintenance records for a minimum of five years.
9. In the event Developer fails to maintain the storm water management/BMP facilities in good working condition acceptable to City, City may enter upon the Property and take whatever steps it deems reasonably necessary to maintain the storm water management/BMP facilities. This provision shall not be construed to allow City to erect any structure of a permanent nature on the Property outside of an easement in favor of City. It is expressly understood and agreed that City is under no obligation to maintain or repair facilities, and in no event shall this Agreement be construed to impose such an obligation on City.
10. In the event that City, pursuant to this Agreement, performs work of any nature, or expends any funds in the performance of such work for labor, use of equipment, supplies, materials, and the like, due to the failure of Developer to perform such maintenance or work, Developer shall reimburse City within 30 days of receipt of notice of all costs incurred by the City to undertake such work. If Developer fails to reimburse City for these costs within 30 days, City shall have the right to record a lien against the property in the amount of such costs, plus the legal rate of interest for judgments, and may enforce the lien in the same manner a lien for real property taxes may be enforced.
11. Developer shall indemnify, defend and hold harmless City and its employees, officials, and agents, from and against any liability, (including liability for claims, suits, actions, arbitration proceedings, administrative proceedings, regulatory proceedings, losses,

expenses or costs of any kind, whether actual, alleged or threatened, interest, defense costs, and expert witness fees), where same results from or arises out of the construction, presence existence, or maintenance of the storm water management/BMP facilities or the performance of this Agreement by Developer, its officers, employees, agents, and sub-contractors, excepting only that resulting from the sole, active negligence or intentional misconduct of City, its employees, officials, or agents. This indemnification obligation is not limited in any way by any limitation on the amount or type of damages or compensation payable to or for Developer or its agents under workers' compensation acts, disability benefits acts or other employees' benefits acts. In the event a claim is asserted against City, its agents or employees', City shall promptly notify landowner. Thereafter, Developer shall defend at its own expense any suit based upon such claim. If any judgment or claim against the City, its agents or employees', shall be entered, Developer shall pay all costs and expenses in connection therewith.

12. Any violation of the final SWMP or this Agreement by Developer shall be deemed a public nuisance under the Sonoma City Code and the City shall be entitled to the remedies available to it under the Sonoma City Code, in addition to and cumulative of all other remedies, civil or criminal, which may be pursued by the City.
13. Developer shall not assign this Agreement to a third party without the express prior written consent of the City, provided that such consent will not be unreasonably withheld and that such consent shall not be required for Developer to sell or lease the property to a third party.
14. Developer binds itself, its partners, successors, legal representatives and assigns to the City and to the partners, successors, legal representatives and assigns of the City with respect to all promises and agreements contained herein.
15. This Agreement shall be recorded by Developer, and shall: a) constitute a "covenant running with the land;" b) be binding in perpetuity upon Developer and Developer's successors, heirs, and assigns; and, 3) benefit the City of Sonoma, its successors, and assigns. Any breach of this Agreement shall render Developer or Developer's heirs, successors or assigns liable pursuant to the provisions of the Sonoma City Code.
16. All future sales or lease agreements shall include a copy of this Agreement, and written conditions, in enough detail to be easily understood by the future property owner or tenant, that require the property owner or tenant to assume responsibility for BMP maintenance and compliance with this Agreement.
17. If any provisions of the Agreement shall be held to be invalid, illegal or unenforceable, the validity, legality and enforceability of the remaining provision shall not in any way be affected or impaired thereby.
18. This Agreement shall be governed according to the laws of the State of California. Because this Agreement is to be performed in the City of Sonoma, the parties hereto agree that the forum for the adjudication of any dispute regarding the Agreement or enforcement shall be brought exclusively and solely in Sonoma City, California.
19. This Agreement is effective as of the Effective Date identified above.

LANDOWNER:

By: _____

Name: _____

Title: _____

THE CITY OF SONOMA:

By: _____

Name: _____

Title: _____

ATTEST:

By: _____

Name: _____

Title: _____

Attachments:

Exhibit A – Property description

Exhibit B – Location map of BMPs as part of this agreement

Notary Acknowledgment

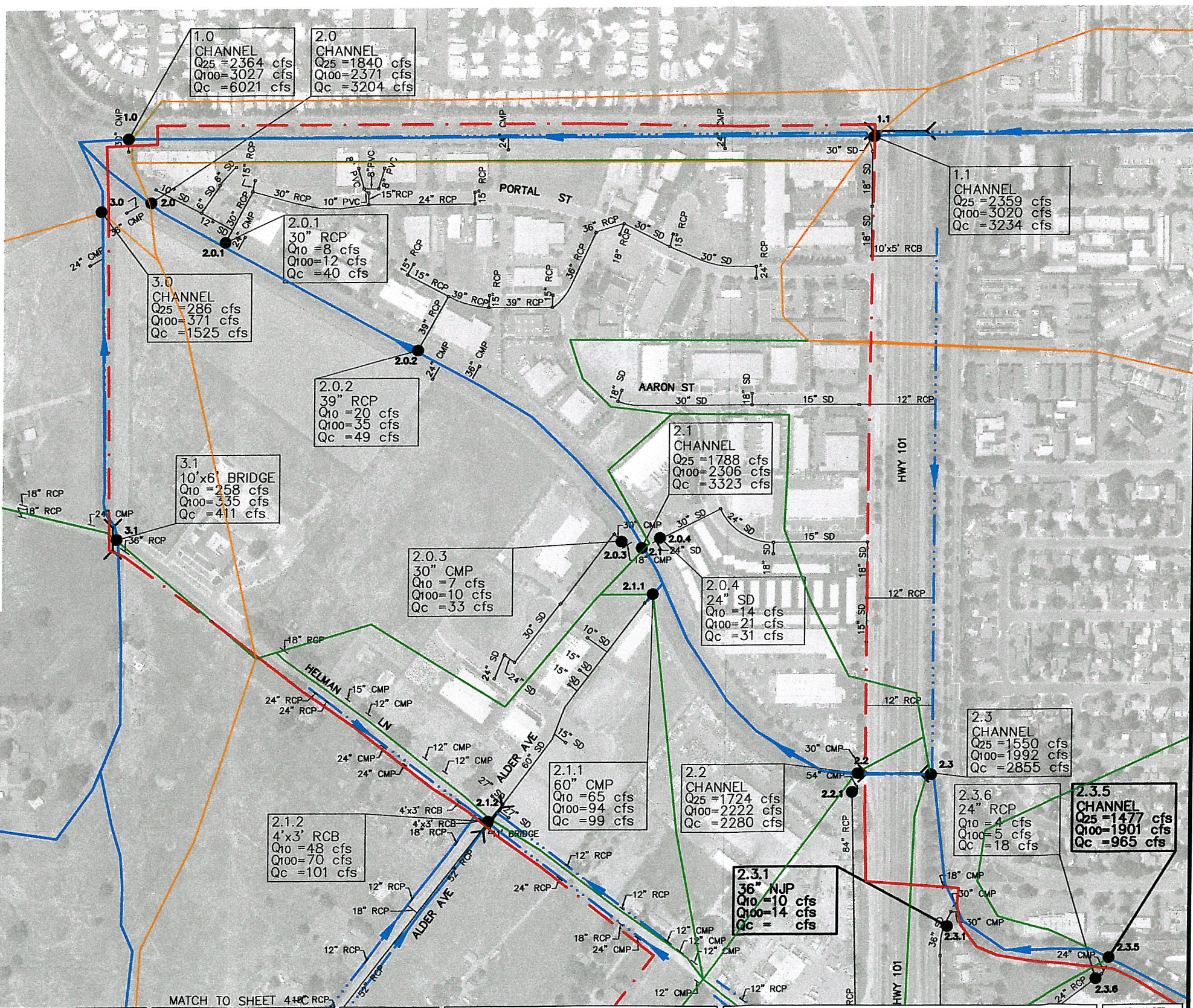
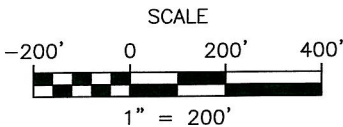
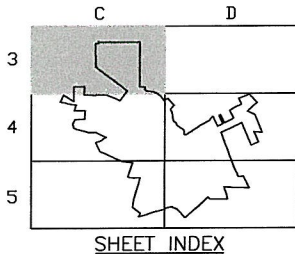
LEGEND

Node ID → NODE DESIGNATION
Pipe Size → DESIGN FLOW (CFS)
Q100 → 100 YEAR, 24 HOUR PEAK FLOW (CFS)
Qc → CAPACITY AT NODE (CFS)

BOLD = UNDERSIZED
 NORMAL TEXT = ADEQUATE

● 3.1 NODE ID
 ○ MANHOLE
 □ DROP INLET

--- WATERWAY
 --- 30" RCP STORM DRAIN CONDUIT
 --- PIPE MATERIAL DIMENSION
 --- SUBWATERSHED BOUNDARY
 --- WATERSHED BOUNDARY
 --- DIRECTION OF FLOW
 --- CITY LIMITS



| NO. | DATE | REVISIONS | BY | APPR. |
|-----|------|-----------|----|-------|
| | | | | |
| | | | | |
| | | | | |
| | | | | |

| | | |
|----------|------|---------------|
| DSGN | JAM | CHKD |
| DRWN | GAA | SCALE 1"=200' |
| approved | date | |
| approved | date | |

MATCH TO SHEET 448C RCP

BAR IS ONE INCH ON ORIGINAL DRAWING.

IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

WINZLER & KELLY
CONSULTING ENGINEERS
485 TESSOMI CIRCLE, SANTA ROSA, CA 95401
P.O. BOX 6798, SANTA ROSA, CA 95406
PH (707) 523-1010
FAX (707) 527-8679

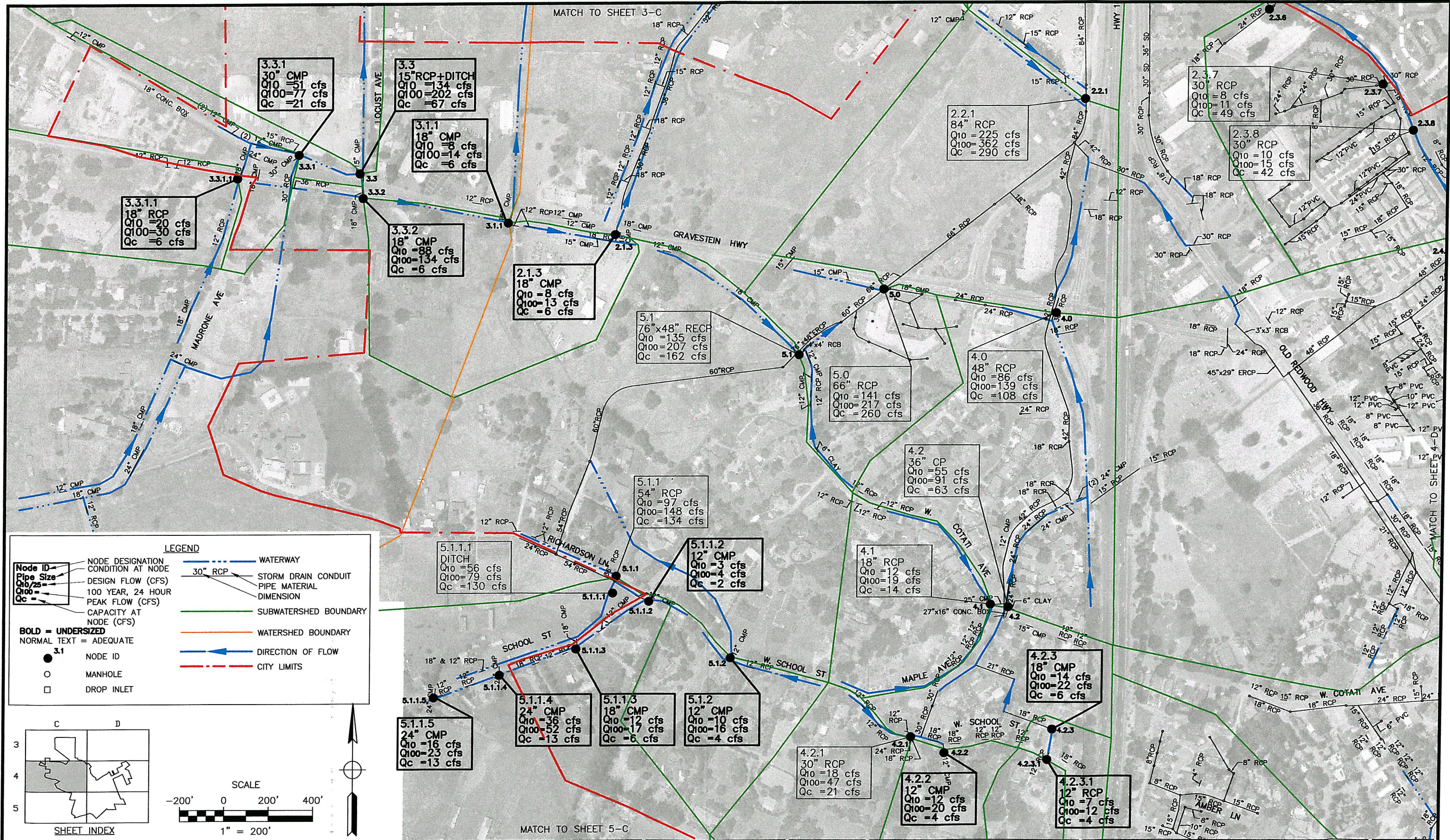
CITY OF COTATI, CALIFORNIA
STORM DRAIN MASTER PLAN
HYDRAULIC STUDY RESULTS

JOB NUMBER
01207705

DRAWING NO.
3-C

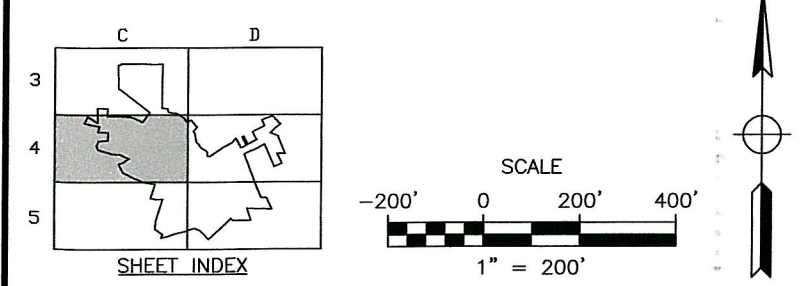
SHEET NO.
5-2

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LEGEND

- Node ID**: NODE DESIGNATION CONDITION AT NODE
- Pipe Size**: DESIGN FLOW (CFS)
- Q10/25**: 100 YEAR, 24 HOUR
- Q100**: PEAK FLOW (CFS)
- Qc**: CAPACITY AT NODE (CFS)
- BOLD = UNDERSIZED**
- NORMAL TEXT = ADEQUATE**
- 3.1**: NODE ID
- O**: MANHOLE
- : DROP INLET
- 30" RCP**: STORM DRAIN CONDUIT
- PIPE MATERIAL**: PIPE MATERIAL
- DIMENSION**: DIMENSION
- SUBWATERSHED BOUNDARY**: SUBWATERSHED BOUNDARY
- WATERSHED BOUNDARY**: WATERSHED BOUNDARY
- DIRECTION OF FLOW**: DIRECTION OF FLOW
- CITY LIMITS**: CITY LIMITS



| NO. | DATE | REVISIONS | BY | APPR. |
|-----|------|-----------|----|-------|
| | | | | |
| | | | | |
| | | | | |
| | | | | |

| | | | |
|----------|-----|-------|---------|
| DSGN | JAM | CHKD | |
| DRWN | GAA | SCALE | 1"=200' |
| approved | | date | |
| approved | | date | |

WINZLER & KELLY
CONSULTING ENGINEERS
485 TESSOMI CIRCLE, SANTA ROSA, CA 95401
P.O. BOX 6798, SANTA ROSA, CA 95406
PH (707) 523-1010
FAX (707) 527-8879

BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

CITY OF COTATI, CALIFORNIA

STORM DRAIN MASTER PLAN

HYDRAULIC STUDY RESULTS

JOB NUMBER
01207705

DRAWING NO.
4-C

SHEET NO.
5-3

Table 6-2.
Proposed Improvement Projects
Cotati Storm Drain Master Plan

| Ranking H=High M=Medium L=Low Numbers indicate project order. | Node ID | Existing Storm Drain Description | Location | Improvement | Growth- Related? | Cost |
|---|--------------------|---|---------------------------------|-----------------------------------|-----------------------------|---------------------|
| H-1 | 2.7.6 | Creek | Water Rd. - Cotati Creek | Install 4'x5' RCB Creek Bypass | NO | \$424,730 |
| H-2 | 3.3 | Ditch | Locust Ave. | Install 6'x4' RCB & 7'x4' RCB | YES | \$2,030,133 |
| H-2 | 3.3.1 | 30" CMP Culvert | Derby Lane | Install 24"-36" RCP | YES | Included in 3.3 |
| H-2 | 3.3.1.1 | 18" RCP Culvert | Gravenstein Hwy at Madrone Ave. | Install 24"-36" RCP | YES | Included in 3.3 |
| H-2 | 3.3.2 | 18" CMP Culvert | Gravenstein Hwy at Locust Ave. | Install 48" SD & 6'x4' RCB | YES | Included in 3.3 |
| M-3 | 5.1.1.1 | Ditch | School St. | Install 30"-48" RCP | NO | \$564,722 |
| M-3 | 5.1.1.2 | 12" CMP Culvert | School St. | Install 18" RCP | NO | Included in 5.1.1.1 |
| M-3 | 5.1.1.3 | 18" CMP Culvert | School St. | Install 24" RCP | NO | Included in 5.1.1.1 |
| M-3 | 5.1.1.4 | 24" CMP Culvert | School St. | Install 36" RCP | NO | Included in 5.1.1.1 |
| M-3 | 5.1.1.5 | 24" CMP Culvert | School St. | Install 30" RCP | NO | Included in 5.1.1.1 |
| M-4 | 4.2 | Ditch US of 36" RCP | Maple Ave. | Install 30"-36" RCP | NO | \$344,515 |
| M-4 | 4.2.2 | 12" CMP Culvert | School St. | Install 24" RCP | NO | Included in 4.2.1 |
| M-4 | 4.2.3 | 18" RCP SD | Backline | Install 18"-24" RCP on School Rd. | NO | Included in 4.2.2 |
| M-4 | 4.2.3.1 | 12" RCP Culvert | School St. | Install 18" RCP | NO | Included in 4.2.2 |
| M-5 | 2.1.3 | 18" RCP Culvert | Gravenstein Hwy at Alder Ave. | Replace w/ 24" Culvert | YES | \$44,577 |
| M-6 | 3.1.1 | 18" RCP Culvert | Gravenstein Hwy. | Replace w/ 24" Culvert | YES | \$43,965 |
| M-7 | 5.1.2 | 12" CMP Culvert | School St. | Replace w/ 24" Culvert | NO | \$33,324 |
| M-8 | 2.5.1 | 30" RCP SD | East Cotati Ave. | Replace w/ 42" RCP | YES | \$53,381 |
| M-8 | 2.5.2 | 42" RCP SD | East Cotati Ave. | Replace w/ 48" RCP | YES | \$97,661 |
| L-9 | 2.3.1 | 36" SD | Commerce Ave. | Correct reverse pipe slope. | NO | \$343,728 |
| | TOTAL | | | | | \$3,980,736 |

Abbreviations: CMP = Corrugated Metal Pipe
RCP = Reinforced Concrete Pipe
RCB = Reinforced Concrete Box
US = Upstream